

We Claim:

1. A device for generating specific and selective signals for application to a capacitive coupling and/or inductive coupling device for the generation of selective electric or electromagnetic fields for the treatment of defective or diseased tissue in a human knee joint, comprising:

a signal generator that generates compound electric signals that selectively up-regulate at least one of AggreCAN gene expression and Type II Collagen gene expression and selectively down-regulates metalloprotease gene expression; and

means for communicating said compound electric signals to said capacitive and/or inductive coupling device.

2. A device as in claim 1, wherein said compound electric signals comprise a 60 kHz sine wave having a peak to peak voltage of approximately 4.6 V to 7.6 V.

3. A device as in claim 2, wherein said compound electric signals comprise a 100% duty cycle signal that is generated for approximately 30 minutes and a 50% duty cycle signal that is generated for approximately 1 hour after said 100% duty cycle signal.

4. A device as in claim 3, wherein said signal generator further generates during a 24 hour time period at least one additional 50% duty cycle signal having a duration of approximately 1 hour.

5. A device as in claim 4, wherein said signal generator is selectable into at least three modes, a first mode for generating during a 24 hour time period said compound electric signal and three of said additional 50% duty cycle signals, a second mode for generating during a 24 hour time period said compound electric signal and two of said additional 50% duty cycle signals, and a third mode for generating during a 24 hour time period said compound electric signal and one of said additional 50% duty cycle signals.

6. A device as in claim 5, wherein said signal generator comprises a switch that may be manually or automatically switched to switch said signal generator into different modes.

7. A device as in claim 1, further comprising means for holding said signal generator in proximity of a patient for communication with said capacitive and/or inductive coupling device.

8. A device as in claim 7, wherein said holding means comprises a Velcro™ strap that holds said signal generator to one of a patient's leg and a knee wrap.

9. A device as in claim 7, wherein said holding means comprises a pocket in one of a knee wrap and leg wrap.

10. A device as in claim 7, wherein said holding means comprises one of a pocket and a holster worn at the patient's waist.

11. A device as in claim 1, wherein said communicating means comprises one of an electric lead and a wireless connection.

12. A device as in claim 1, wherein said signal generator comprises a microcontroller responsive to time of day data to selectively generate said compound electric signals at predetermined treatment times.

13. A device as in claim 1, wherein said signal generator generates compound electric signals that down-regulate the gene expression of metalloproteases and other proteases in the treatment of cancer and in the prevention of metastases in cancer.

14. A device as in claim 1, wherein said signal generator is selectable to generate said compound electric signal at different voltages in accordance with a circumference of a patient's knee.

15. A non-invasive electromagnetic therapeutic method for treating defective or diseased tissue in a human knee joint, comprising the steps of:

generating compound electric signals comprising a 60kHz sine wave having a peak to peak voltage of approximately 4.6 V to 7.6 V and a 100% duty cycle signal that is generated for approximately 30 minutes and a 50% duty cycle signal that is generated for approximately 1 hour after said 100% duty cycle signal; and

communicating said compound electric signals to one of a capacitive coupling and an inductive coupling device in the proximity of a patient's knee for the generation of a specific and selective electromagnetic field that treats said diseased tissue.

16. A method as in claim 15, wherein said generating step comprises the step of generating during a 24 hour time period at least one additional 50% duty cycle signal having a duration of approximately 1 hour.

17. A method as in claim 16, wherein said generating step comprises the step of selecting one of at least three duty cycle modes, a first mode for generating during a 24 hour time period said compound electric signal and three of said additional 50% duty cycle signals, a second mode for generating during a 24 hour time period said compound electric signal and two of said additional 50% duty cycle signals, and a third mode for generating during a 24 hour time period said compound electric signal and one of said additional 50% duty cycle signals.

18. A method as in claim 15, comprising wherein said generating step comprises the step of selecting a voltage for said compound electric signal in accordance with a circumference of a patient's knee.